



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

08/719,341

09/25/1996

SEETHARAMAIAH MANNAVA

13DV-12522

9351

27622

7590

05/04/2005

STEVEN J. ROSEN  
4729 CORNELL ROAD  
CINCINNATI, OH 45241

EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT

PAPER NUMBER

3745

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

08/719,341

Applicant(s)

MANNAVA ET AL.

Examiner

Christopher Verdier

Art Unit

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 May 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 March 1995 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Art Unit: 3745

Applicants' Amendment dated May 13, 2004 has been carefully considered but is deemed non-persuasive. The examiner appreciates the filing of the Terminal Disclaimer disclaiming U.S. Patent 5,531,570.

Applicants have argued on pages 1-2 of the Response that Mannava 5,591,009 is not available as a reference under 35 USC 103 because the Mannava '009 patent was filed after an Invention Disclosure "Enhanced Compressor Blade for Aircraft Engines" signed by the Applicants was disclosed to the Applicants' employer and based upon which the parent application of the present application was filed. Applicants state that a declaration signed by Applicants was submitted earlier supporting this position, and the declaration states that the Applicants invented the present invention prior to the effective or filing date of the Mannava et al. '009 patent, and that the Declaration states that the Applicants conceived the present invention prior to the effective or filing date of the Mannava et al. '009 patent and was diligent in reducing it to practice up until the filing date of the present invention, and that proof of diligence was submitted in the form of test data from tests performed during the time between conception and filing the present Application.

These arguments are not persuasive, because the Office action of June 8, 1998 stated that the declaration filed on March 13, 1998 under 37 CFR 1.131 is insufficient to overcome the Mannava '009 reference, because the Mannava 5,591,009 reference is a U.S. patent that claims the rejected invention. An affidavit or declaration is inappropriate under 37 CFR 1.131(a) when the patent is claiming the same patentable invention, see MPEP § 2306. If the reference and this

Art Unit: 3745

application are not commonly owned, the reference can only be overcome by establishing priority of invention through interference proceedings. See MPEP Chapter 2300 for information on initiating interference proceedings. If the reference and this application are commonly owned, the reference may be disqualified as prior art by an affidavit or declaration under 37 CFR 1.130. See MPEP § 718. Note that the same patentable invention is defined in MPEP 715.05 as when the invention is considered obvious under 35 USC 103. The specific limitation in the claims of the instant application of the compressor blade being peened is obvious as taught by Neal 4,426,867, and the specific limitation in the claims of the instant application of the laser beam spots having a power density being in a range between 100 and 200 joules per square centimeter is obvious, as taught by Mallozzi 3,850,698.

The evidence submitted is insufficient to establish a conception of the invention prior to the effective date of the Mannava '009 reference. While conception is the mental part of the inventive act, it must be capable of proof, such as by demonstrative evidence or by a complete disclosure to another. Conception is more than a vague idea of how to solve a problem. The requisite means themselves and their interaction must also be comprehended. See *Mergenthaler v. Scudder*, 1897 C.D. 724, 81 O.G. 1417 (D.C. Cir. 1897). Applicants stated that Exhibit A is a sketch showing a gas turbine engine compressor airfoil having a laser shock peened surface on the leading edge. Applicants also stated that an Invention Disclosure Statement was disclosed to General Electric Company no later than May 14, 1994 as shown in exhibit A. In items 4 and 5, Applicants stated that on March 1, 1995 and March 3, 1995, Applicants assigned all rights in their patent application to the General Electric Company. However, exhibit A has not been

Art Unit: 3745

provided to the examiner. Without documentary evidence such as sketches, blueprints, or drawings, these allegations of fact cannot be supported. See MPEP 715.07.

The evidence submitted is insufficient to establish diligence from a date prior to the date of reduction to practice of the Mannava '009 reference to either a constructive reduction to practice or an actual reduction to practice. The declaration does not include any evidence of or statement alleging establishment of diligence from a date prior to the date of reduction to practice of the Mannava reference to either a constructive reduction to practice or an actual reduction to practice.

The evidence submitted is insufficient to establish a reduction to practice of the invention in this country or a NAFTA or WTO member country prior to the effective date of the Mannava '009 reference. The declaration does not include any evidence of or statement alleging establishment of a reduction to practice of the invention in this country or a NAFTA or WTO member country prior to the effective date of the Mannava reference.

Applicants have further argued that Mannava '009 teaches laser shock peening of a fan blade and not a compressor blade, and that Mannava '009 does not claim the instant invention. This argument is not persuasive, because the same patentable invention is defined in MPEP 715.05 as when the invention is considered obvious under 35 USC 103. The specific limitation in the claims of the instant application of the compressor blade being peened is obvious as taught by Neal 4,426,867, and the specific limitation in the claims of the instant application of the laser

Art Unit: 3745

beam spots having a power density being in a range between 100 and 200 joules per square centimeter is obvious, as taught by Mallozzi 3,850,698. With regard to Applicant's arguments that the statement that the specification limitation in the instant application of the peening depth of 20 to 50 mils being considered obvious is not conclusive because the examiner did not take into account the differences of the leading edges between the fan blade taught by Mannava '009 and the compressor blade taught by the invention, and that the limitation of the peening depth being 20 to 50 mils is without support in the prior art, it is noted that the limitation of the laser beam spots having a power density being in a range between 100 and 200 joules per square centimeter, and not the limitation of the peening depth being 20 to 50 mils was meant to be stated as obvious.

Applicants have argued that the stresses of the instant application are deep stresses produced by far stronger forces than taught by Neal, and that Neal deals with compressor blades which are denoted as having thin leading edges and warns against strong forces of direct shot peening fearing damage to the blade edges caused by severe impact of shot on the surface to be peened. Applicants have further argued that the depth limitation points out the nature of the compressive residual stresses imparted by laser shock peening and points out that they are deep stresses and far stronger than those taught by Neal, that the prior art has not shown laser shock peening to be interchangeable with or the equivalent of shot peening, and that the shock waves produce forces that act normal to the surface of the edges of the airfoil and directly away from the teaching of Neal which desires the impact of the shot to be at a maximum oblique angle to the tangent of the edge surface which is designed to lessen the peening force to avoid

Art Unit: 3745

deformation. Applicants have further argued that Neal teaches away from Mannava '009 and the instant application by warning away from using a direct force normal to the surface being peened as is done with the present application and Mannava '009. Applicants have pointed out the differences in thickness of leading edges of fan blades as disclosed in Mannava '009 and those of the compressor blades of Neal. Applicants have further argued that the examiner did not take into account that Neal states that normal shot peening damages the leading edge surface and that Neal teaches to lessen the blow by directing the shot at an oblique angle tangent to surface, which teaches one not to use the teaching in Mannava '009 to peen an edge of a compressor airfoil. Applicants have further argued that because of the angling of the blade in Neal, it would be impossible to have simultaneously peened pressure and suction sides of the edges of the blades.

These arguments are respectfully disagreed with, because the rejection of claims 1-20 under 35 U.S.C. 103(a) as being unpatentable over Mannava '009 in view of Neal and Mallozzi 3,850,698 merely relied upon Neal to generally teach that compressor blades may be peened for the purpose of reducing compressor blade fatigue. The rejection then explained that it would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize the repaired laser shock peened gas turbine engine component of Mannava for the compressor blades as taught by Neal for the purpose of reducing compressor blade fatigue. That is, Neal was relied upon to generally teach that compressor blades may be peened, and the rejection did not state that Neal was relied upon for its teachings of directing the shot at an oblique angle tangent to surface. The claims of the instant application do not recite the depth of

Art Unit: 3745

20 to 50 mils, and also do not recite any geometric relationships of the laser shock peening relative to the airfoil surfaces. These features upon which applicant relies are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With regard to the double patenting rejection of claims 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 16, 17, and 18 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 1, 3, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, and 3 of U.S. Patent No. 5,591,009 in view of Neal and Mallozzi 3,850,698, and the rejection of claims 9-10, 14-15, and 19-20 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 4, 4, 4, 4, 4, and 4, respectively, of U.S. Patent No. 5,591,009 in view of Neal and Mallozzi 3,850,698, Applicants have argued against the double patenting rejections stating that the claims in Mannava '009 all claim a fan blade which is substantially different than a compressor blade, that fan blades are far bigger and thicker than compressor blades, and that a well known concern for the thinness of compressor blades is expressed in Neal, and that Neal teaches compressor blades can be peened at oblique angles avoiding normal hits along the edge and warns against normal hits along the edge. These arguments are respectfully disagreed with for the same reasons set forth in the paragraph above.



***Terminal Disclaimer***

The terminal disclaimer filed on May 13, 2004 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent 5,531,570 has been reviewed and is accepted. The terminal disclaimer has been recorded.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mannava '009 in view of Neal and Mallozzi 3,850,698. Mannava '009 discloses a repaired laser shock peened gas turbine engine component 8 substantially as claimed, including a metallic

Art Unit: 3745

airfoil/blade 34 having a leading edge LE and a trailing edge TE and a pressure side 46 and a suction side 48, at least a first laser shock peened surface 54 on a first side of said airfoil, said laser shock peened surface extending radially along at least a portion of said leading edge and extending chordwise from said leading edge, and a first region 56 having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said laser shock peened surface wherein said deep compressive residual stresses are formed, with said first laser shock peened surface located along said pressure side 46 of said leading edge, a second laser shock peened surface 54 located along said suction side 48 of said leading edge and extending radially along at least a portion of said leading edge and extending chordwise from said leading edge, and a second region 56 having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said second laser shock peened surface wherein said deep compressive residual stresses are formed, wherein said laser shock peened regions extending into said airfoil from said laser shock peened surfaces are formed by simultaneously laser shock peening both sides of said airfoil, and third and fourth laser shock peened surfaces 54, 54 extending radially at least along a portion of said trailing edge and extending chordwise from said trailing edge on said pressure and suction sides respectively of said airfoil, a third laser shock peened region 56 having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said third laser shock peened surface, and a fourth laser shock peened region 56 having deep compressive residual stresses imparted by laser shock peening (LSP) extending into said airfoil from said fourth laser shock peened surface, with the third and fourth laser shock peened regions extending into the

Art Unit: 3745

airfoil from the laser shock peened surfaces being formed by simultaneously laser shock peening both sides of the trailing edge of the airfoil.

However, Mannava does not disclose that the component is a compressor blade, and does not disclose that the laser shock peening spots are at a power density of 100-200 Joules per square centimeter.

Neal (column 2, lines 65-68) teaches compressor blades may be peened for the purpose of reducing compressor blade fatigue.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to utilize the repaired laser shock peened gas turbine engine component of Mannava for the compressor blades as taught by Neal for the purpose of reducing compressor blade fatigue.

Mallozzi '698 (figure 1 and column 5, lines 23-26) teaches that laser shock peening of a surface may occur at a power density of between 10 to 10,000 Joules per square centimeter, for the purpose of improving hardness and strength.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to perform the laser shock peening at a power density of 100-200 Joules

Art Unit: 3745

per square centimeter, as taught by Mallozzi '698, for the purpose of improving hardness and strength.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 16, 17, and 18 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 1, 3, 1, 3, 1, 1, 3, 1, 1, 3, 1, 1, and 3 of U.S. Patent No. 5,591,009 in view of Neal and Mallozzi 3,850,698. Claims 1 and 3 of US Patent '009 claim substantially the same subject matter as the instant application except for the gas turbine engine component being a compressor blade, and except for the laser shock peening spots being at a power density of 100-200 Joules per square centimeter.

Art Unit: 3745

Neal (column 2, lines 65-68) teaches compressor blades may be peened for the purpose of reducing compressor blade fatigue.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the gas turbine engine component of Mannava as the compressor blades as taught by Neal for the purpose of reducing compressor blade fatigue.

Mallozzi '698 (figure 1 and column 5, lines 23-26) teaches that laser shock peening of a surface may occur at a power density of between 10 to 10,000 Joules per square centimeter, for the purpose of improving hardness and strength.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to perform the laser shock peening at a power density of 100-200 Joules per square centimeter, as taught by Mallozzi '698, for the purpose of improving hardness and strength.

Claims 9-10, 14-15, and 19-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 4, 4, 4, 4, 4, and 4, respectively, of U.S. Patent No. 5,591,009 in view of Neal and Mallozzi 3,850,698. Claim 4 of US Patent '009 claims substantially the same subject matter as the instant application except for the gas turbine engine component being a compressor blade, and except for the laser shock peening spots being at a power density of 100-200 Joules per square centimeter.

Art Unit: 3745

Neal (column 2, lines 65-68) teaches compressor blades may be peened for the purpose of reducing compressor blade fatigue.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the gas turbine engine component of Mannava as the compressor blades as taught by Neal for the purpose of reducing compressor blade fatigue.

Mallozzi '698 (figure 1 and column 5, lines 23-26) teaches that laser shock peening of a surface may occur at a power density of between 10 to 10,000 Joules per square centimeter, for the purpose of improving hardness and strength.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to perform the laser shock peening at a power density of 100-200 Joules per square centimeter, as taught by Mallozzi '698, for the purpose of improving hardness and strength.

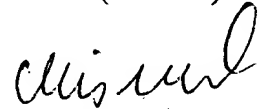
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 3745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.  
April 28, 2005



Christopher Verdier  
Primary Examiner  
Art Unit 3745